

What is claimed is:

1. An image reading device comprising;

an infrared component separator that separates color

5 components of an image light flux passing through a

transmissive original into an infrared component;

an infrared image-capturing device that outputs an
infrared image signal by capturing the infrared component of
the image light flux that has been separated by said infrared

10 component separator;

a visible component separator that separates the color
components of the image light flux passing through the
transmissive original into a visible component;

a visible image-capturing device that outputs a visible
15 image signal by capturing the visible component of the image
light flux that has been separated by said visible component
separator

an image forming optical system that forms the image of
the light flux passing through the transmissive original at
20 said infrared image-capturing device or said visible image-
capturing device;

a focal adjustment device that adjusts a position of said
image forming optical system relative to the transmissive
original;

25 a means for image forming position decision-making that

determines the position of said image forming optical system relative to the transmissive original as a visible image forming position at which the visible light component of the image light flux is formed at said visible image-capturing device based upon said infrared image signal; and

a control device that implements control on said focal adjustment device based upon a decision made by said means for image forming position decision-making.

2. An image reading device according to claim 1; further comprising:

an infrared component detector that detects a level of the infrared component obtained through separation by said infrared component separator; and

a correction device that detects a defect signal attributable to dirt, dust, a scratch or the like on the transmissive original based upon the infrared component level detected by said infrared component detector and corrects the visible image signal by using said defects signal thus detected.

3. An image reading device according to claim 2, wherein; said correction device comprises;

a defective infrared component detector that detects a defective infrared component level at a defective position in

the transmissive original manifesting an infrared component level lower than a first infrared component level;

a correction coefficient calculator that obtains a correction coefficient by calculating (first infrared component level)/(defective infrared component level) based upon said first infrared component level and said defective infrared component level;

a visible component detector that detects a visible component level of said visible component obtained through separation by said visible component separator; and

a multiplier that calculates the corrected visible component level by multiplying the defective visible component level at the defective position in the transmissive original by said correction coefficient.

4. An image reading device according to claim 1, wherein:

said infrared image-capturing device receives the infrared component of light passing through the transmissive original at a plurality of pixels and outputs a plurality of image signals each indicating an intensity level of the component of light received at the associated pixel; and

said means for image forming position decision-making receives a plurality of infrared image signals output by said infrared image-capturing device at a plurality of measuring positions corresponding to various distances set between the

transmissive original and said image forming optical system to determine said visible image forming position in correspondence to the position of said image forming optical system relative to the transmissive original with the highest contrast value among contrast values of said plurality of infrared image signals.

5. An image reading device according to claim 1, wherein:

said means for image forming position decision-making selects either the visible image signal or said infrared image signal and determines said visible image forming position based upon the selected image signal.

6. An image reading device according to claim 5, wherein:

said means for image forming position decision-making determines said visible image forming position based upon said infrared image signal after a failure to determine said visible image forming position based upon the visible image signal occurs.

7. An image reading device according to claim 6, wherein:

said means for image forming position decision-making receives both the visible image signal and said infrared image signal in advance to determine said visible image forming position based upon said infrared image signal after a failure

to determine said visible image forming position based upon the visible image signal.

8. An image reading device according to claim 6, wherein:

5 said means for image forming position decision-making receives the infrared image signal output by said infrared image-capturing device after a failure to determine said visible image forming position based upon the visible image signal, to determine said visible image forming position based upon said infrared image signal occurs.

9. An image reading device according to claim 6, wherein:

15 said visible image-capturing device receives the visible component of light passing through the transmissive original at a plurality of pixels and outputs a plurality of visible image signals each indicating an intensity level of the component of light received at the associated pixel; and

20 said means for image forming position decision-making receives said plurality of visible image signals output by said visible image-capturing device at a plurality of measuring positions corresponding to various distances set between the transmissive original and said image forming optical system, detects the largest contrast value representing a maximum value among contrast values of said
25 plurality of visible image signals and determines that a

failure to determine said visible image forming position has occurred if the largest contrast value is smaller than a threshold value.

- 5 10. An image reading device according to claim 6, wherein:
said visible image-capturing device receives the visible component of light passing through the transmissive original at a plurality of pixels and outputs a plurality of visible image signals each indicating an intensity level of the
10 component of light received at the associated pixel; and
said means for image forming position decision-making receives said plurality of visible image signals output by said visible image-capturing device at a plurality of measuring positions corresponding to various distances set
15 between the transmissive original and said image forming optical system, detects the largest contrast value representing a maximum value among contrast values of said plurality of visible image signals, calculates a corrected largest contrast value by correcting the largest contrast
20 value and decides that a failure to determine said visible image forming position has occurred if at least one of the contrast values obtained at measuring positions outside a specific range which includes the measuring position corresponding to the largest contrast value exceeds the
25 corrected contrast value.

11. An image reading device according to claim 1, wherein:

said means for image forming position decision-making includes a storage device that stores a quantity of displacement manifesting between a position at which the infrared image is formed by said image forming optical system and a position at which the visible image is formed by said image forming optical system along the direction of the optical axis of said image forming optical system, to enable said means for image forming position decision-making to determine an infrared image forming position at which an image of the infrared component is formed at said infrared image-capturing device based upon said infrared image signal and to determine said visible image forming position based upon the quantity of displacement and the infrared image forming position.

12. A storage medium storing a control procedure to be implemented in an image reading device, comprising:

an infrared component separator that separates color components of an image light flux passing through a transmissive original into an infrared component;

an infrared image-capturing device that outputs an infrared image signal by capturing the infrared component of the image light flux that has been separated by said infrared

component separator;

a visible component separator that separates the color components of the image light flux passing through the transmissive original into a visible component;

5 a visible image-capturing device that outputs a visible image signal by capturing the visible component of the image light flux that has been separated by said visible component separator;

an image forming optical system that forms the image of
10 the light flux passing through the transmissive original at said infrared image-capturing device or said visible image-capturing device;

a focal adjustment device that adjusts a position of said image forming optical system relative to the transmissive
15 original;

with said storage medium storing therein;

an image forming position decision-making procedure through which the position of said image forming optical system relative to the transmissive original is determined as
20 a visible image forming position at which an image of the visible component of the image light flux is formed at said visible image-capturing device based upon the infrared image signal; and

a control procedure through which said focal adjustment
25 device is controlled in conformance to the decision made

through said image forming position decision-making procedure are stored.

13. A storage medium storing a control procedure to be
5 implemented in an image reading device, according to claim 12,
wherein:

said image forming position decision-making procedure
includes a procedure through which either the visible image
signal or the infrared image signal is selected and said
10 visible image forming position is determined in correspondence
to the selected image signal.

14. A storage medium storing a control procedure to be
implemented in an image reading device, according to claim 13,
15 wherein:

said image forming position decision-making procedure
includes a procedure through which said visible image forming
position is determined based upon the infrared image signal
after a failure to determine the visible image forming
20 position based upon the visible image signal occurs.

15. A storage medium storing a control procedure to be
implemented in an image reading device, according to claim 14,
wherein:

25 said visible image-capturing device receives the visible

component of light passing through the transmissive original at a plurality of pixels and outputs a plurality of visible image signals each indicating an intensity level of the component received at the associated pixel; and

5 said image forming position decision-making procedure includes a procedure through which said plurality of visible image signals output by said visible image-capturing device at a plurality of measuring points corresponding to various distances set between the transmissive original and said image forming optical system are input, a procedure through which 10 the largest contrast value representing a maximum value among the contrast values of said plurality of visible image signals is detected and a procedure through which a decision is made that a failure to determine a visible image forming position 15 has occurred if the largest contrast value is smaller than a threshold value.

16. A storage medium storing a control procedure to be implemented in an image reading device, according to claim 14, 20 wherein:

 said visible image-capturing device receives the visible component of light passing through the transmissive original at a plurality of pixels and outputs a plurality of visible image signals each indicating an intensity level of the 25 component of light received at the associated pixel; and

said image forming position decision-making procedure includes a procedure through which said plurality of visible image signals output by said visible image-capturing device at a plurality of measuring points corresponding to various

5 distances set between the transmissive original and said image forming optical system are input, a procedure through which the largest contrast value representing a maximum value among the contrast values of said plurality of visible image signals is detected, a procedure through which a corrected largest
10 contrast value is calculated by correcting the largest contrast value and a procedure through which it is decided that a failure to determine said visible image forming position has occurred if at least one of the contrast values at measuring positions outside a specific range which includes
15 the measuring position corresponding to the largest contrast value exceeds the corrected contrast value.